UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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May 21, 2004

Virginia Electric and Power Company
ATTN: Mr. David A. Christian
Senior Vice President and
Chief Nuclear Officer
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5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: SURRY POWER STATION - NRC SAFETY SYSTEM DESIGN AND PERFORMANCE CAPABILITY INSPECTION REPORT NOS. 05000280/2004006 AND 05000281/2004006

Dear Mr. Christian:

On April 8, 2004, the Nuclear Regulatory Commission (NRC) completed a safety system design and performance capability team inspection at your Surry Power Station. The enclosed report documents the inspection findings which were discussed on April 8, 2004, with Mr. R. Blount and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspection team reviewed selected procedures and records, observed activities, and interviewed personnel.

This report contains one NRC-identified finding which involves the failure of the turbine building flood protection system to provide adequate protection for all flooding scenarios. The finding has potential safety significance greater than very low significance; however, a final safety significance determination has not been completed. Pending completion of this significance determination, the finding is documented as an unresolved item. The finding does not present an immediate safety concern.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the

NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Charles R. Ogle, Chief
Engineering Branch 1
Division of Reactor Safety

Docket Nos.: 50-280, 50-281
License Nos.: DPR-32, DPR-37

Enclosure: NRC Inspection Report 05000280/2004006 and 05000281/2004006
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-280, 50-281
License Nos.:	DPR-32, DPR-37
Report Nos.:	05000280/2004006 and 05000281/2004006
Licensee:	Virginia Electric and Power Company (VEPCO)
Facility:	Surry Power Station, Units 1 & 2
Location:	5850 Hog Island Road Surry, VA 23883
Dates:	March 22-26, 2004 April 5-8, 2004
Inspectors:	R. Moore, Senior Reactor Inspector (Lead Inspector) R. Schin, Senior Reactor Inspector C. Smith, Senior Reactor Inspector D. Mas-Penaranda, Reactor Inspector R. Taylor, Reactor Inspector
Approved by:	Charles R. Ogle, Chief Engineering Branch 1 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

IR 05000280/2004006, 05000281/2004006; 03/22-26/2004 and 04/05-08/2004; Surry Power Station, Units 1 and 2; Safety System Design and Performance Capability Inspection.

This inspection was conducted by a team of inspectors from the NRC Region II office. The team identified one unresolved item with potential safety significance greater than green. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

TBD. A finding was identified in that the turbine building flood control system did not provide adequate protection for all licensing basis flooding scenarios. Specifically, portions of the flooding detection and mitigation circuitry would not be available for a flooding event which involved a concurrent loss of offsite power.

The finding is unresolved pending completion of a significance determination. The finding is greater than minor because it affects the design control attribute of the mitigating systems cornerstone objective. The licensee's interim actions included establishing a roving turbine building flood watch if a loss of offsite power occurs to assure early detection of a flood. (Section 1R21.13)

B. Licensee-Identified Violations

None.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events and Mitigating Systems

1R21 Safety System Design and Performance Capability (71111.21)

The team reviewed the licensee's capability for detection, mitigation, and prevention of the design base flood and the Internal Plant Examination (IPE) internal flood events. The design base flood is a leak in the non-seismic piping which can be isolated by operator action in 20 minutes or isolated by automatic closure of the circulating water (CW) inlet valves when water level in the turbine building (TB) basement reaches a level of nine inches. The design base flood can occur concurrent with a loss of offsite power (LOOP).

The worst case IPE internal flood event was reviewed. This flood event is due to failure of TB seismic piping or components. The flooding can be isolated in 24 hours with the stop logs at the upper intake structure for flood rates below the critical flood rate of 10,100 gallons per minute (gpm). Above the critical flood rate there is no mitigation credited by the IPE analysis. The station relies on prevention provided by the circulating water/service water (CW/SW) piping inspection and re-coat program, expansion joint inspection program, maintenance measures to prevent leaks through maintenance activities, and measures to maintain the functional reliability and integrity of the isolation valves. (Although not credited in the licensee's IPE analysis, station procedures provide guidance for a dual unit shutdown; rapid depressurization and cool down of the reactor coolant systems; and drain down of the upper intake canal (heat sink inventory) in the event of an IPE internal flood event.) A LOOP is not assumed in conjunction with the IPE flood event.

The inspection team focused on mitigation and prevention capabilities defined in NRC safety evaluation reports and other correspondence between the licensee and the NRC regarding design basis and IPE internal flood events. Additionally, the team reviewed the licensee's applicability evaluations and corrective actions for industry operating experience issues related to internal flooding events.

.1 System Needs

.11 Process Medium

a. Inspection Scope

The team reviewed the availability and reliability of water sources required for the potential dual unit shutdown as a result of an internal flooding event. These included the condensate storage tank (CST) system's capability to transfer water from 300,000 gallon condensate storage tank to the 100,000 gallon emergency CSTs and the capability to cross-connect auxiliary feedwater between units. The review included machine history, vendor recommendations, and conditions adverse to quality for Valves

1-CN-151, 1-CN-150, and 1-CN-144 used to transfer water between these tanks. The team also walked down the valves to ensure proper plant configuration.

b. Findings

No findings of significance were identified.

.12 Energy Sources

a. Inspection Scope

The team reviewed test and design documents to verify that the 480 volt alternating current (VAC) power sources were adequate to meet minimum voltage specifications for electrical equipment during and following an internal flooding event. This included a review of design torque values for motor-operated valves (MOVs) to verify that the safety functions (open/closed) were adequately tested assuming minimum voltage. A specific list of components reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

.13 Instrumentation and Controls

a. Inspection Scope

The team reviewed the instrumentation that is used by operators for detection of flooding in the TB, emergency switchgear room (ESGR), and auxiliary building (AB). Instrumentation used for detection included the condenser outlet and inlet pit high and high-high alarm level switches; the Amertap pit high and high-high alarm level switches; Units 1 and 2 auxiliary building flood level switches; Units 1 and 2 ESGR flood level switches; and mechanical equipment room (MER) 3 flood level switches. For these instruments, the team reviewed the internal flooding accident analysis, design basis documents, calculations, design documents, and vendor documents which established the basis for functional testing of the level switches. The review was performed to verify that the alarm set points, and emergency operating procedure (EOP) action levels were consistent with the design and licensing basis.

For controls used for internal flood mitigation, the team reviewed the instrument installation drawings and elementary diagrams for the control circuits for the above level switches. Additionally, the team reviewed the electrical elementary diagrams of the condenser CW inlet and outlet MOVs; the service water to bearing cooling heat exchanger inlet MOVs; TB sump pumps; and the AB sump pumps. The objective of the drawing review was to confirm that the circuits implemented the functional requirements stated in the design and licensing basis. The specific documents reviewed are included in the Attachment to this report.

In addition, the team reviewed the power supplies for TB flood detection instruments to verify redundant power supply to assess the reliability and availability of power to the instrumentation. A specific list of components reviewed is included in the Attachment to this report.

The team reviewed the following documents to understand the plant's licensing basis with respect to turbine building flooding:

- Safety Evaluation Report (SER) dated December 18, 1980: Susceptibility of Safety-Related Systems to Flooding from Failure of Non-Category 1 Systems for Surry Power, Units 1 and 2

- Appendix A to the aforementioned SER (also dated December 18, 1980): NRC Guidelines For Protection From Flooding of Equipment Important to Safety

- UFSAR Appendix 9C, Revision 35, dated September 30, 2003: Flood Control System

- VEPCO Final Report, Level II, Task 670-09, Internal Design Basis, Surry Power Station, dated June 30, 1992

- Design Change Notice (DCN) No. 74-55, Flood Control; Circulating Water Flood Trips, dated July 13, 1992

b. Findings

Introduction: A finding was identified in that the turbine building flood control system did not provide adequate protection for all licensing basis flooding scenarios. Specifically, portions of the flooding detection and mitigation circuitry would not be available for a flooding event which involved a concurrent loss of offsite power.

Description: Based on a review of the documents above, the team determined that turbine building flooding was the subject of multiple letters between the licensee and the NRC (AEC) during the period 1972 to 1980. The licensing basis for the design basis flood evolved over this period and is documented in the December 18, 1980, SER. The licensee's flood mitigation strategy included installation of a system of alarms, shields, and dikes to detect and limit flooding until the flooding source could be isolated. This SER concluded that the system of alarms, shields, and dikes installed by the licensee would allow an operator twenty minutes from the time of the first alarm to isolate a TB flooding source. This SER also credited the licensee's flood mitigation strategy with automatic closure of the CW inlet MOVs. Appendix A to this SER specifically required that simultaneous loss of offsite power be considered with the rupture of a non-seismic system, component, or pipe.

DCN No. 74-55 was prepared and implemented by the licensee to mitigate a design basis TB flood caused by failure of non-seismic condenser circulating water piping or

non-seismic service water piping. This modification was implemented on both units. The scope of the design change included, among other design features, the installation of sump level switches with instrumentation and alarm capability. The instrumentation and alarms were designed to immediately alert the operators of TB flooding, thereby allowing them to take timely action to isolate the flooding source by closing the CW condenser inlet MOVs. The instrumentation also provided a two-out-of-three logic signal for automatic closure of CW condenser inlet MOVs in the event that operators failed to manually close the MOVs within the necessary time frame. Level switches were installed in the following turbine building pits:

- Pit located just south of the condenser where the circulating water intake lines to the condenser are located.
- Pit located just north of the condenser where the circulating water discharge lines from the condenser are located.
- Amertap equipment pit located north of the condenser.

In the documents reviewed, the team could not find any evidence that this instrumentation and alarm capability were required to be, or were designed to be, safety related.

In order to ensure that the condenser circulating water inlet MOVs would close during a TB flood, DCN No. 74-55 specified and provided a power supply for the CW condenser inlet MOVs which would be available following a LOOP. However, the DCN specified and provided an electrical power supply for the TB flood level detection instrumentation and CW condenser inlet valve closure logic that would not be available following a LOOP. As a result, this instrumentation and closure logic would not function during a LOOP, as required by the licensing basis. The team was concerned that a LOOP could potentially occur as the result of an earthquake, which could also cause a rupture of non-seismic piping. In this scenario, the initiating event for TB flooding would, therefore, defeat the capability of the level switches to perform their design function and result in the loss of the flood detection alarms. This initiating event would also defeat the circulating water inlet isolation MOV automatic closure instrumentation and prevent automatic closure of these valves.

The instrumentation and closure logic had a “loss of power” annunciator that would alarm during a LOOP. However, during a TB flooding event concurrent with a LOOP scenario run on the simulator, the team observed that the operators did not assign sufficient priority to this annunciator to warrant immediate investigation of potential flooding in the turbine building. The LOOP caused a reactor trip and operators used EOPs to stabilize the plant before responding to the many annunciators that were in an alarm condition. Consequently, the postulated flooding progressed for about 20 minutes before the control room became aware of the flooding. The team determined that the operators were not immediately alerted to a flooding condition as detailed in the SER.

The licensee's interim action to address this issue was to establish a TB flood watch if a LOOP occurs to assure early detection of a flood when the instrumentation is not operable.

Analysis: The finding is greater than minor because it affects the design control attribute of the mitigating systems cornerstone objective. This design could result in the loss of early warning to the operators of a design basis TB flooding event which would negatively impact the response time credited to the operators in the SER. This failure also would result in the loss of automatic closure of the safety-related condenser circulating water inlet MOVs during a TB flooding event concurrent with a LOOP. Further, the annunciator provided to warn the operators of loss of power to this circuit may not prompt manual actions in all flooding scenarios. The finding has potential safety significance greater than very low significance; however, a final safety significance determination has not been completed. The finding will remain unresolved pending NRC completion of the significance determination process.

Enforcement: The design of the TB flood control system was inadequate in that it failed to provide adequate protection for all licensing basis flooding scenarios. Specifically, on July 13, 1979, the licensee developed and installed DCN No. 74-55 and failed to provide power supplies for the turbine building flood level detection instrumentation and CW condenser inlet valve closure logic that would be available following a LOOP. No violation of regulatory requirements was identified by the inspectors. Nevertheless, the failure to provide an adequate design is a finding. Pending NRC completion of the significance determination, this finding is identified as Unresolved Item (URI) 05000280, 281/2004006-001: Failure to Provide a Power Supply for Turbine Building Flood Instrumentation and CW Condenser Inlet Valve Logic Which Would be Available Following a LOOP.

.14 Operator Actions

a. Inspection Scope

The team reviewed operating procedures related to mitigation or prevention of an internal flooding event, walked them down in the plant, and discussed them with operators. This review included annunciator response procedures, abnormal procedures (APs), EOPs, operator rounds checklists and guidance, and procedures for removal from service and restoration of condenser water boxes and bearing cooling heat exchangers. The team also reviewed the Updated Final Safety Analysis (UFSAR) accident analysis and IPE analysis for internal flooding, calculations of flooding rates and times available for operator actions, operator training information, and operator job performance measures related to internal flooding. In addition, the team observed a simulation of a turbine building flooding event by a crew of licensed operators on the plant reference simulator. This review and observation focused on consistency and adequacy of the analyses, procedures, and training for operator actions.

The team review of operator actions also checked if the procedures were written clearly and followed the EOP writers' guide, instrumentation and alarms were available to operators for making necessary decisions, and local operator actions would not be affected by the flooding. Specific operator actions that were reviewed included rapidly shutting down, cooling down, and depressurizing both units simultaneously; cross-connecting charging between units; cross-connecting auxiliary feedwater (AFW) between units; refilling the emergency condensate storage tank; local manual operation of the steam generator power-operated relief valves; and local manual control of AFW flow to the steam generators without AC electrical power. Procedures reviewed by the team are included in the Attachment to this report.

b. Findings

Introduction: An unresolved item (URI) was identified for NRC review of whether the licensee's preplanned and proceduralized departures from technical specification (TS) requirements, without obtaining NRC approval, constitute a non-compliance with NRC regulations.

Description: The licensee's probabilistic risk assessment (PRA) identified uncontrollable turbine building flooding as the highest risk event for the two units, with a core damage frequency (CDF) of about 2.1 E-5 per year for each unit. Uncontrollable turbine building flooding could result from a break in safety-related (seismically designed) piping upstream of an isolation MOV; a break in non-seismic piping downstream of an isolation MOV with a failure of the isolation MOV; or as a result of a maintenance error. One contributor to the flooding risk was the gravity flow of water from the elevated intake canal through the turbine building basement, so that the flooding could not be stopped by merely turning off a pump. Another contributor to the risk was the location of both trains of station safety-related AC and direct current (DC) switchgear for both units in the basement level ESGR, where they were vulnerable to damage from certain turbine building flooding scenarios.

The team reviewed whether uncontrollable turbine building flooding was within the plant licensing basis. The licensing basis for internal turbine building flooding was described in an NRC SER titled: "Susceptibility of Safety-Related Systems to Flooding from Failure of Non-Category I Systems for Surry Power Station Units 1 and 2," dated December 18, 1980. This SER addressed the susceptibility of safety-related systems to flooding from failure of non-seismic systems. The SER stated that a system of alarms, switches, shields, dikes, and seals will allow the operator approximately 20 minutes to isolate the flood source. The team observed that each section of large non-seismic piping in the turbine building (i.e., circulating water and service water) was located downstream of a safety-related MOV that could be closed from the control room to isolate flooding. Consequently, the team determined that uncontrollable turbine building flooding as described above was outside the plant licensing basis as described in this SER.

The licensee had voluntarily initiated procedures to address uncontrollable turbine building flooding in 1994. The actions for operators to perform in the event of uncontrollable turbine building flooding were in two procedures: AP -13.0, "Turbine Building Flooding," Rev. 13; and Fire Contingency Action (FCA) -6.01, "Uncontrollable Turbine Building Flooding," Rev. 2. The team noted that these two procedures included preplanned departures from TS requirements. The actions in these procedures that departed from TS included draining the intake canal below TS limits (to stop the flooding); rapidly cooling down and depressurizing both units simultaneously in excess of TS limits [to reduce the potential reactor coolant pump (RCP) seal loss of coolant accident (LOCA) flowrate]; and then deenergizing all safety-related AC switchgear for both units (just before they are flooded). The procedures stated that these actions will be performed in accordance with 10 CFR 50.54(x) to protect the public health and safety.

The team noted that the proceduralized departures from TS included drastic measures that might not be appropriate [e.g., draining the ultimate heat sink (intake canal) and rapidly cooling down the reactor coolant system (RCS). The rapid cooldown was at a faster rate than any cooldown allowed by the EOPs, which had been reviewed by the NRC. The licensee's safety evaluation for these procedures did not evaluate whether these actions were safe or were the best actions to prevent core damage. The safety evaluation focused on whether NRC review and approval was required. Also, the team noted that the proceduralized departures from TS would not prevent core damage. The licensee's PRA recognized that and gave no credit to the procedures for preventing core damage after an uncontrollable turbine building flooding event occurred.

The team also noted that some actions that were not in the procedures might be able to mitigate core damage without departing from TS requirements. The licensee had identified some such actions in a 1991 internal document titled "Accident Management Strategy for Surry Internal Flooding." One action identified by the licensee that was not in the procedures but that could potentially mitigate core damage involved powering a remote monitoring panel with a portable generator. The remote monitoring panel could enable operators to monitor key parameters and control the reactor temperature for both units, after the flooding caused a loss of all station AC and DC electrical power, by manually controlling steam generator atmospheric dump valves and turbine driven auxiliary feedwater pump flowrates. Another action identified by the licensee that was not in the procedures involved using temporary cables to bypass the flooded switchgear and power a charging pump from the emergency diesel generators. The charging pump could then provide makeup water to the RCS. The team also noted that the procedures included no actions to stop or reduce the flooding if attempts to close the MOVs were unsuccessful.

The licensee had determined that the procedure quality requirements of TS 6.4 and 10 CFR 50, Appendix B, applied to Procedures AP-13.0 and FCA-6.01. The licensee had a safety evaluation for approval of these procedures which included an unreviewed safety question determination. The safety evaluation stated:

> 10 CFR 50.54(x) states: "A licensee may take reasonable action that departs from a license condition or a technical specification in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications can provide adequate or equivalent protection is immediately apparent." While the procedures provide guidance for actions which are outside Surry Technical Specification design basis, NRC review and approval are not required due to the nature of the accident scenario being outside the plant licensing basis, and direction provided in the Code of Federal Regulations.

The licensee's safety evaluation concluded that NRC review and approval were not required because uncontrollable turbine building flooding was outside of the plant licensing basis and because 10 CFR 50.54(x) allowed departing from TS requirements in emergency conditions.

The team reviewed whether 10 CFR 50.54(x) allowed having procedures that depart from TS requirements. The team found that the statements of consideration (SOC) for 10 CFR 50.54(x) stated that TS are to address normal, transient, and accident conditions. Further, the SOC stated that provisions of 50.54(x) were intended for unanticipated circumstances that can occur during the course of emergencies and that may call for responses different than any considered during the course of licensing or development of the TS. The SOC also stated that technical specifications or license conditions can be amended by the NRC, and the rule is not intended to apply in circumstances where time allows this process to be followed. The SOC further stated that 50.54(x) was to be invoked only if equivalent protective actions consistent with the license were not available, the actions to depart from the license were reasonable, and the actions served to protect the public health and safety. Consequently, the team considered that 10 CFR 50.54(x) did not appear to authorize these proceduralized departures from TS because:

- the departures may not serve to protect the public health and safety;
- other protective actions consistent with the license were apparently available;
- the departures involved anticipated circumstances; and
- the licensee had time to request a TS amendment.

Summary: This issue will remain open for NRC review of whether the licensee's preplanned and proceduralized departures from TS requirements, without obtaining NRC approval, constitute a non-compliance with NRC regulations. It will be identified as URI 05000280,281/2004006002: Acceptability of Proceduralized Departures from TS Requirements Without NRC Approval.

.15 Heat Removal

a. Inspection Scope

The team reviewed the reliability and availability of cooling for equipment required to mitigate the internal flooding event and possible dual unit shutdown. This included cooling water to the charging pumps and ventilation to the charging pump spaces. Components selected for review included charging cooling fans (CCF) air/motor operated dampers, CCF fans, and valves which ensure reliability of seal injection from the other unit. Vendor manuals, design documentation, drawings, and surveillance and test procedures, were reviewed to verify that vendor recommendations for equipment operation were satisfied.

b. Findings

No findings of significance were identified.

.2 System Condition and Capability

.21 Installed Configuration

a. Inspection Scope

The team performed field walkdowns of internal flood mitigation equipment in the TB and AB to observe general material condition, identify degraded conditions, and verify the installed configuration was consistent with design drawings and design inputs to calculations. This equipment included TB flood level switches, Amertap flood level switches, TB sump pumps, AB sump pumps, expansion joints, TB drain systems and back flow preventer valves in the ESGR, AB, and charging pump cubicles. Additionally, the team performed a visual examination of accessible service water and circulating water piping, manhole access covers, flood dikes, and upper intake structure stop logs. Also, the team verified that equipment location, including breakers locations, was consistent with the applicable diagrams. The team performed a visual inspection to verify that the distance between the breaker and its component was consistent with design documents and voltage drop calculations. A specific list of components reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

.22 Operation

a. Inspection Scope

The team walked down selected portions of operating procedures described in Section 1R21.14 above to assess the procedures and the plant for human factors considerations such as procedure clarity and accuracy, component labeling, lighting, noise, communications, and accessibility. The team also checked if selected system alignments were consistent with design and licensing basis assumptions. In addition, the team checked if the times required to perform the local operator actions were consistent with the times available for the actions as described in analyses and calculations.

b. Findings

No findings of significance were identified.

.23 Design

a. Inspection Scope

Mechanical Design Review

The team reviewed design calculations, specifications, and UFSAR Chapter 9.C, Internal Flooding, as well as NRC safety evaluation reports and NRC/Surry correspondence related to design basis flooding and IPE flooding, to identify the design criteria which defined the required capacity and capability of internal flooding mitigation equipment. This equipment included flow shields, dikes, stop logs, and sump pumps. Design Change 91-031: Flood Mitigating Modifications / Surry / Units 1 and 2, Rev. 8, was reviewed to verify that system and equipment design functions were appropriately evaluated and maintained. Surveillance test procedures and equipment monitoring activities were reviewed to verify the design criteria was appropriately translated into acceptance criteria.

Electrical, Instrumentation and Controls Design Review

The team reviewed elementary diagrams to verify that the logic was consistent with design basis functions for the selected equipment. The review included the logic for the actuation/starting of TB sump pumps to verify it was consistent with the system operation described in UFSAR Section 9.C.2 and Nuclear Control Room Operator Development Program, Surry Power Station, Module NCRODP-9-5, Turbine Building Services. Installation drawings for the flood level switches were also reviewed to verify that the installed elevations of the flood level switches were consistent with the flood detection setpoint values specified in design output documents. A specific list of components reviewed is included in the Attachment to this report

The team reviewed thermal overload set points for the motors of the components against vendor information, work orders, preventive maintenance and procedures to verify the adequacy of thermal overload protection for the equipment. In addition, the team reviewed modifications DC-93-017, Modify CW Condenser Inlet MOVs to Be Submersible, Rev. 8, and DC-93-080, Thermal Overload Replacements, Rev. 2.

b. Findings

No findings of significance were identified.

.24 Testing and Inspection

a. Inspection Scope

The team reviewed performance and post-maintenance testing of sump pumps and CW/SW isolation valves to verify that the tests and inspections were appropriately verifying that the assumptions of the licensing and design bases were being maintained and that performance degradation would be identified. The team reviewed electrical preventive maintenance procedures which documented the results of tests performed on the station flood detection system, and the TB flood control system. The review was performed to verify that specified acceptance criteria were met and that the equipment operation was consistent with the plant's licensing and design bases. A specific list of equipment reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

.3 Selected Components

.31 Component Degradation

a. Inspection Scope

The team reviewed maintenance and testing documentation, performance trending, and equipment history as identified by work orders, Plant Issue reports (PIs), and system health reports to assess the licensee's actions to verify and maintain the safety function, reliability, and availability of selected components. Plant work orders completed for the performance of corrective and preventive maintenance of flood level detection and alarm systems were reviewed to verify that the licensee was implementing corrective actions that were adequate for resolution of any instrumentation and control problems. Also reviewed were potential common cause failure mechanisms due to flooding, maintenance, parts replacement, and modifications. A specific list of equipment reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

.32 Equipment/Environmental Qualification

a. Inspection Scope

The team reviewed preventive maintenance records for selected electrical equipment to verify that environmental qualification requirements were being maintained. Specifically, this included submergence qualification of the CW condenser inlet MOVs to the main condensers. The team reviewed testing, administrative controls, and post-maintenance tests for selected components. These components include the flood protection dike at the ESGR, back flow preventers, turbine building sump pumps, auxiliary building sump pumps, and watertight door to the ESGR. The team also reviewed floor drain drawings to identify any additional sources of drain back-flow to the ESGR, MER 3, and charging pump room cubicles not containing back flow preventers. A specific list of equipment reviewed is included in the Attachment to this report.

b. Findings

No findings of significance were identified.

.33 Equipment Protection

a. Inspection Scope

For both units, the team reviewed the licensee's programs to maintain equipment and piping integrity to prevent the occurrence of flooding. This included the CW/SW piping inspection and re-coat program, the expansion joint inspection program, and activities to maintain CW/SW isolation valves' material specifications to reduce the probability of a valve stem separation that could induce a system water hammer pressure transient. Additionally, the team reviewed the implementation and maintenance of cathodic protection for those portions of the CW/SW systems subject to galvanic corrosion.

b. Findings

No findings of significance were identified.

.34 Component Inputs/Outputs

a. Inspection Scope

The team reviewed selected CW and SW MOV operator requirements calculations and evaluated the capability of the MOVs to perform their design function under degraded voltage conditions. The specific MOVs reviewed are the same as those reviewed for

Section 1R21.12 and are listed in the Attachment to this report. The team also reviewed the instrumentation input signals from the flood detection instruments for the automatic closure of the CW condenser inlet MOVs.

b. Findings

No findings of significance were identified.

.35 Operating Experience

a. Inspection Scope

The team reviewed the licensee's applicability evaluations and corrective actions for industry experience issues related to flooding events and check valve problems. The specific documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

.36 CW/SW Piping Inspection and Re-coat Program

a. Inspection Scope

The team reviewed the implementation of the licensee's CW/SW inspection and re-coat program to verify that appropriate monitoring and maintenance activities were accomplished to provide assurance of system boundary integrity and that the program was implemented as described in the NRC/Surry IPE correspondence. Documents reviewed included procedures and maintenance work orders for piping inspections and repairs, qualification of coating applicators, PIs which identified and evaluated through-wall indications, schedules of piping inspections, and station standards for coatings materials.

b. Findings

No findings of significance were identified.

.37 CW/SW Expansion Joint Inspection Program

a. Inspection Scope

The team reviewed the licensee's implementation of the expansion joint inspection program to verify that appropriate monitoring and maintenance was accomplished to provide assurance of system boundary integrity for expansion joints and that the program was implemented as described in the NRC/Surry IPE correspondence. Documents reviewed included station expansion joint specifications, vendor certification

and test documentation, Electric Power Research Institute expansion joint maintenance guidance, joint inspection procedures and work orders, and modifications which replaced installed expansion joints.

b. Findings

No findings of significance were identified.

.4 Identification and Resolution of Problems

a. Inspection Scope

The team reviewed selected system health reports, maintenance records, surveillance test records, flood level switches functional test records, and PIs to verify that design and performance problems were identified and entered into the corrective action program. Additionally, the team assessed the scope of the licensee's extent-of-condition reviews and the adequacy of the corrective actions. The specific documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA6 Meetings, Including Exit

The lead inspector presented the inspection results on April 8, 2004, to Mr. R. Blount and other members of the licensee staff. The licensee acknowledged the findings presented. Proprietary information is not included in this inspection report.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

R. Blount, Dominion Site Vice President
B. Garber, Dominion Licensing Supervisor
A. Hall, Dominion Nuclear Projects Department Engineer
E. Hendrixon, Dominion Engineering Manager
P. Kershner, Dominion Licensing
M. Oppenhimer, Dominion Assistant Site Engineering Manager
K. Sloan, Dominion Management
B. Stanley, Dominion Maintenance Manager
W. Webster, Dominion Engineer

NRC (attended exit meeting)

D. Arnett, Resident Inspector
N. Garrett, Senior Resident Inspector
K. Landis, Project Branch Chief, RII
G. McCoy, Senior Resident Inspector

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000280,281/2004006-001	URI	Failure to Provide a Power Supply for Turbine Building Flood Instrumentation and CW Condenser Inlet Valve Logic Which Would be Available Following a LOOP (Section 1R21.13)
05000280,281/2004006-002	URI	Acceptability of Proceduralized Departures from TS Requirements Without NRC Approval (Section 1R21.14)

Attachment

LIST OF DOCUMENTS REVIEWED

Procedures

O-MPM-1901-01, Mechanical Preventive Maintenance, High Level Intake Structure Screen wells and Associated Piping Inspection, Rev. 11
VPAP-0811, Service Water System Inspection and Maintenance Program, Rev. 3
0-MCM-1003-01, Expansion Joint Removal, Inspection, and Installation, Rev. 3
SSAP-0008, Qualification of Protective Coating Applicators and Blasters, Rev. 6
0-AP-13.00, Turbine Building or MER 3 Flooding, Rev. 13
0-AP-37.00, Seismic Event, Rev. 5
0-FCA-6.01, Uncontrollable Turbine Building Flooding, Rev. 2
0-VSP-F4, Aux Bldg Sump Hi Lvl, Rev. 2
0-VSP-M4, Flood Cont Pnl Trbl, Rev. 2
1-ECA-0.0, Attachment 6, Establishing Chg Pump Crosstie, Rev. 21
1-FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 18
1-MOP-BC-001, Removal From and Return to Service of BC Heat Exchangers, Rev. 4
1-MOP-CW-003, Removal from Service of Waterbox B, Rev. 11
1-MOP-CW-004, Return to Service of Waterbox B, Rev. 15
1E-E4, Turb Bldg Flood Valve Closure or Trouble, Rev. 4
1J-F4, CST 110,000 Gal Lo Lvl, Rev. 3
DNOS-0201, Housekeeping, Rev. 0
DNOS-0308, Watch Station Rounds, Rev. 0
GMP-012, Roving Flood Watch Responsibilities, Rev. 3
OC-47, Turbine Building Sump Pump Status Verification, dated 3/18/03
PT/1J-E6, Turbine Room Sump Hi or Loss Cont Volt, Rev. 1
PT/0-VSP-F4, Aux Bldg Hi Lvl, Rev. 2
PT/1-DRP-007, Motor Operated Valves Operating Bands, Rev. 29
PT/0-ECM-0306-02, Motor Control Center Maintenance, Rev. 31
PT/0-ECM-1504-01, Limitorque MOV Operator Maintenance, Rev. 14
PT/0-ECM-1402-03, Charging Pump Service water Pump Motor Maintenance, Rev 4
Test Procedure NO. 42263-03, Sealing SMB-000,SMB-00, SMB-0, and SMB-2 Limitorque Operators for Submersible Service For Virginia Power, Rev. 0
0-MPM-1900-02, Flood Protection Floor Drain Back Water Stop Valve Replacement, Rev. 8
1-MOP-CW-001, Removal From Service of Water Box A, Rev. 10 and 11
OC-48, Assessment Of Maintenance Activities For Potential Flooding Of TB & Associated Areas
0-MPM-1901-01,CW Inlet Pipe Inspections, Rev. 11
1-OSP-PL-001, Performance Testing Of Turbine Building Sump Pumps 1-PL-P-2A,B,C
1-OSP-PL-002, Performance Testing Of Turbine Building Sump Pumps 1-PL-P-2D,E,F
2-OSP-PL-001, Performance Testing Of Turbine Building Sump Pumps 2-PL-P-2A,B,C
GMP-011, Installation And Removal of Stop Logs
GMP-013, Removal And Installation Of Flood Protection Dikes
0-MCM-0812-01, BC and CC heat Exchanger Cleaning
0-MPM-1900-01, Annual Inspection Of Flood And Spill Protection Dikes, Dams, And Expansion Joint Shields
1-PT-25.1, Quarterly Testing Of CW And SW System Valves
1-OPT-CW-001, Leak Test Of The Circulating Water Inlet And Outlet 96" Valves

1-OPT-SW-001, Leak Test Of Service Water Valves 1-SW-MOV-101A And 1-SW-MOV101B
1-PT-18.10P, MOV Position Indication Test

Drawings

11448-FE-18F, Wiring Diagram AC distribution Panel 1TB1 & 1TB2 Surry Power Station - Unit 1, Rev. 25
11448-ESK-11M, Elementary Diagram Circulating Water Flooding Trip Surry Power Station - Unit 1, Rev. 4
11548-ESK-11M, Elementary Diagram Circulating Water Flooding Trip Surry Power Station - Unit 2, Rev. 5
11448-FE-11F, Wiring Diagram Vital Bus Distribution Panels Surry Power Station - Unit 1, Rev. 11
11448-FE-11B, Wiring Diagram Vital Bus Distribution Panels 1-II & 1-IV Surry Power Station - Unit 1, Rev. 39
11548-FE-11B, Wiring Diagram Vital Bus Distribution Panels 2-II & 2-IV Surry Power Station - Unit 2, Rev. 32
11448-ESK-6CR1, Elementary Diagram Misc Pump Circuits Surry Power Station Unit - 1
11448-FE-1M, 480v One line Diagram Surry Power Station - Unit 1, Rev. 60
11448-FE-1L, 480v One line Diagram Surry Power Station - Unit 1, Rev. 53
11448-FE-1H, 480v One line Diagram Surry Power Station - Unit 1, Rev. 45
11448-FE-1J, 480v One line Diagram Surry Power Station - Unit 1, Rev. 32
11448-FE-1C,One line Diagram 4160v Bus 1C & 1G 4160v Transfer Bus Surry Power Station - Unit 1, Rev. 18
11448-FE-1D, 4160v One line Diagram Surry Power Station - Unit 1, Rev. 17
11448-FE-1Q, 480v One line Diagram Emergency Switchgear 1H1 &1J1 Surry Power Station - Unit 1, Rev. 10
11548-FE-1Q, 480v One line Diagram Emergency Switchgear 2H1 & 2J1 Surry Power Station - Unit 2, Rev. 13
11448-FE-1P, 480v One line Diagram Surry Power Station - Unit 1, Rev. 42
11548-FE-1J, 480v One line Diagram Surry Power Station - Unit 2, Rev. 22
11448-FE-9BE, Wiring Diagram 480v MCC 1J1-1 Section 1,2&3 Surry Power Station -Unit 1, Rev. 33
11448-FE-1P1, 480v One line Diagram MCC 1J1-1A Surry Power Station -Unit 1, Rev. 4
11448-FB-27A, Plumbing & Fire Protection Service Building - Unit 1, Rev. 16
11448-FB-27F, Plumbing Service Building - Unit 1, Rev. 9
11448-FM-071A, Flow/Valve Operating Numbers Diagram Circulating And Water System Surry Power Station Unit 1, Rev. 83

Calculations

MCC-1223.13-00-0021, Containment Pressure Instrument Sensing Line Condensation during a Loss of Coolant Accident, Rev.1
NSA-91191, Accident Management Strategy, Surry Internal Flooding, November 18, 1991
Safety Evaluation 94-090; for Procedures 0-AP-13.00, Turbine Building or MER 3 Flooding, and EE-0501, MOV Motor Performance Update, Rev. 1

ME-0238, Torque Calculation for 02-SW-MOV-201A Replacement Valve, Rev. 0
ME-0237, Torque Calculation and Motor Operated Calculation for CW-100A-D, CW-106A-D, CW-200A-D, and CW-206A-D, Rev.0
ME- 0245, Torque Requirements - Safety Related MOVs Furnished by Jamesbury, Rev. 0
0-FCA-6.01, Uncontrollable Turbine Building Flooding; dated 5/2/94
EE-0034, Surry Voltage Profiles, Rev. 2
93-VAPOWER, Motor Starting Analysis, 3/30/2004
SM-0911, CDF Impact with Reduced TB Sump Pump Capacity, Rev. 0
02071.1910, Turbine Building Flood Volume & Operator Response Time, Rev. 0
DEO-0086, BCHX Service Water Expansion Joints, Structural and Hydraulic Adequacy

Design Basis Documents

Letter; AEC to Surry, Request for Review of the Failure of any Non-Category I (seismic) Equipment and Potential Impact on Performance of Safety-Related Equipment, 9/26/72
Letter; AEC to Surry, Guidelines for Review of Non-Category I Equipment That Could Jeopardize Safe Shutdown of the Facility, 10/31/74
Safety Evaluation Report: Susceptibility of Safety-Related Systems to Flooding from Failure of Non-Category 1 Systems for Surry Power Station Units 1 and 2, 12/18/80
Letter; Surry to NRC, Surry Power Station Units 1 and 2, IPE - Internal Flooding Re-analysis, (Serial No. 91-134D), 11/26/91
Safety Assessment by the Office of Nuclear Reactor Regulation, VEPCO, Surry Power Station Units 1 and 2, Assessment of Plant Internal Flooding Vulnerability, (TAC Nos. M74476 and M74477), 3/21/92
Letter; Surry to NRC, Status of Modifications and Activities Associated with Internal Flooding, Serial No. 92-299, 5/27/92
Innsbrook Technical Center Memorandum, Final Report, Level II, Task 670-09, Surry Power Station: Internal Flooding Design Basis, 6/30/92
Letter; Surry to NRC, Surry Power Station Units 1 and 2, Removal of Interim Measures - Diesel Driven Sump Pumps and Dedicated Crane Operators, 9/3/92
Letter; Surry to NRC, Internal Flooding Long Term Modifications, Serial No. 92-299A, 10/30/92
Letter; Surry to NRC, Internal Flooding Update, Serial Nol 93-163, 4/12/93
Letter; Surry to NRC, Surry Power Station Units 1 and 2, Additional Information Regarding Internal Flooding, Serial No. 93-163A, 6/21/93

Updated Final Safety Analysis Report

UFSAR Section 9C.1, Design Base Flooding
UFSAR Section 9C.2, IPE Internal Flooding

Lesson Plans/Job Performance Measures (JPM)

JPM 12.02, Direct the Response to Turbine Building Flooding, Rev. 10
JPM 13.04, Locally Isolate Service Water to #3 MER During Flooding, Rev. 6
JPM 13.04B, Isolate Service Water to MER #3 During Flooding, Rev. 7
JPM 13.07, Isolate Service Water to MER #5 During Flooding, Rev. 10

JPM 13.08, Locally Isolate Service Water to MER #5 During Flooding, Rev. 4
JPM 41.02, Locally Establish Charging Pump Crosstie, Rev. 8

Modifications

DC No. 93-080, Thermal Overload Replacement, Rev.2
DC No. 93-017, Modify CW Limitorque Motor Operators to be submersible, Rev. 8
91-031, Flood Mitigating Modifications / Surry / Units 1 And 2

Completed Work Orders

00479254 01, Inspect 96 inch CW expansion joint - main condenser 1A Waterbox outlet, 2/10/03
00485007, Unit 2 cathodic protection for SW piping using procedure 0-ECM-2501-02, 4/7/03
00485007, Unit 1 cathodic protection for SW piping using procedure 0-ECM-2501-02, 4/3/03
0046008201, CM Condenser CW Outlet valve leaks,11/25/2001
0026010701, CM A1 Contacts replaced with A2 Contacts cycled breaker, 3/12/94
0029162402, CM Remove / Reinstall Motor to allow removal of pump for repair, 6/14/94
0042041701, CM Received 2 high level alarms with 10 min with no reason identified locally, 11/15/99
0028204502, CM Motor windings open, replace motor, 2/13/94

Vendor Documents and Technical Manuals

VTM 38-A468, Turbine Building Sump Pumps
VTM 38-P426-00001, Bearing Cooling MOVs

Miscellaneous Documents:

Garlock Certification of Conformance/Compliance, Expansion Joint 1-CW-REJ-100D, 3/20/03
Specification NAS-3001/NUS-3004, Dominion Specification for Outside Containment Protective Coatings, Rev. 6
STD-MAT-0004, Materials/ISI Engineering Standard - Criteria for Selection of Coating Materials (inside and outside containment) Rev. 13
EPRI Expansion Joint Maintenance Guide, Rev. 1, (1008035) Final Report - May 2003
Specification SUP-0051, Specification for Rubber Expansion Joints, Surry Power Station Units 1 and 2, Rev. 0

Plant Issue Reports

S-2003-1239 Circulating Water Inlet Valve Graphitic Corrosion
S-2003-5626 Circulating Water Inlet Valve General Corrosion
S-200102454 Back Flow Preventer Valves Not Representative Of Drawing
S-2003-1312, Expansion joint inspection of 02-CW-REJ-206C inadequate
S-2002-2310, Back flow preventer 01-PL-BFP-11 no longer manufactured.
S-2002-2052, 7-day administrative clock expired for TB sump pump 2B
S-2002-1772, Special order expansion joint 01-SW-REJ-101B does not fit.

S-2001-2154, TB sump pumps 2A and 2B in alert range.
S-2001-0216, Minor leak on expansion joint 1-SW-REJ-101B
S-2003-2490, Pipe wall thickness readings required on pipe CW-PP-96.00-WC-3-10
S-2001-3349-E1, Coatings inspection on the 96 inch 1A valve,11/17/1
S-2000-0490, Insufficient votes torque data, 3/1/00
S-2000-1314-R1,Torque values exceeded the limits,
S-2003-3900-R2, Work practice accounted for over half of the human performance PIs, 8/28/2003
S-1999-2705-R2, Turbine Building Leak, 11/29/99
S-2001-3539-R5, A through wall leak was discovered downstream of 1-CW-MOV-100C, 11/24/2001
S-2001-2886-E1, Leakage was initially indicated through 1-CW-MOV-100B, 10/12/2001
S-2000-1203-R3, Torque settings were set above their available motor torque capability, 5/11/2000

Plant Issue Reports Written Due to this Inspection

S-2004-1220	Expansion Joint 1-SW-REJ-1-PIPE (outside the TB) has exceeded its service life
S-2004-1280	Discrepancy between calculations in IPE flood analysis and operator response time in AP 13.0, TB or MER3 Flooding
S-2004-1336	MER 3 water tight door has no electronic alarm to detect the door is open
S-2004-1337	Simulator Discrepancy - Alarms for sump pits in TB incorrectly modeled as vital power supply
S-2004-1338	No specific mitigation strategy exists to permit core uncovery for an event which floods the ESGR
S-2004-1339	Procedure discrepancies which compromise operator response times to a flood event
S-2004-1348	Acceptance criteria in TB sump pump test procedure not consistent with assumptions in IPE analysis
S-2004-1351	Procedure errors and unclear statements in Flood procedure FCA 6.01
S-2004-1350	Procedure errors and unclear statements in Flood procedure AP 13.0

Section 1.R21.12.a.: Energy Sources Components Reviewed

1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	1-VS-F-58 A&B
1-SW-P-10A,B	1-DA-P3A,B
01-PL-P-2A,B,C,D,E,F	02-PL-P-2A,B.C
01-CW-LS-106A1,2,3	01-CW-LS-106B1,2,3
02-CW-LS-206A1,2,3	02-CW-LS-206B1,2,3
01-DA-LS-104B	01-DA-107

Section 1R21.14.a.: Operations Actions Procedures Reviewed

0-AP-13.00, Turbine Building or MER 3 Flooding, Rev. 13
0-AP-37.00, Seismic Event, Rev. 5
0-FCA-6.01, Uncontrollable Turbine Building Flooding, Rev. 2

0-VSP-F4, Aux Bldg Sump Hi Lvl, Rev. 2
0-VSP-M4, Flood Cont Pnl Trbl, Rev. 2
1-ECA-0.0, Attachment 6, Establishing Chg Pump Crosstie, Rev. 21
1-FR-H.1, Response to Loss of Secondary Heat Sink, Rev. 18
1-MOP-BC-001, Removal From and Return to Service of BC Heat Exchangers, Rev. 4
1-MOP-CW-003, Removal from Service of Waterbox B, Rev. 11
1-MOP-CW-004, Return to Service of Waterbox B, Rev. 15
1E-E4, TB Flood Valve Closure or Trouble, Rev. 4
1J-F4, CST 110,000 Gal Lo Lvl, Rev. 3
DNOS-0201, Housekeeping, Rev. 0
DNOS-0308, Watch Station Rounds, Rev. 0
GMP-012, Roving Flood Watch Responsibilities, Rev. 3
OC-47, Turbine Building Sump Pump Status Verification, dated 3/18/03

Section 1R21.15.a.: Heat Removal Components Reviewed

2-CH-258 1-CH-728
2-CH-477 1-CH-267
1-CH-276 1-VS-F-58 A&B

Section 1R21.21.a.: Installed Configuration Components Reviewed

1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	1-VS-F-58 A&B
1-SW-P-10A,B	1-DA-P3A,B
01-PL-P-2A,B,C,D,E,F	02-PL-P-2A,B.C
1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	1-VS-F-58 A&B
1-SW-P-10A,B	1-DA-P3A,B
01-PL-P-2A,B,C,D,E,F	02-PL-P-2A,B.C
1-CH-258	1-CH-728
2-CH-477	1-CH-267
1-CH-276	1-VS-F-58 A&B
1-PL-BFP-14	1-PL-BFP-15
1-PL-BFP-16	

Section 1R21.24.a: Testing and Inspection Components Reviewed

1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	01-PL-P-2A,B,C,D,E,F
02-PL-P-2A,B.C	

Section 1R21.31.a.: List of Components Reviewed

CW/SW expansion joints:1-CW-REJ-100A,B,C,D, 101A,B,C,D, 106A,B,C,D, 101A,B,
Unit 1 CW 96 inch piping, Train A & Train C
Unit 2 CW 96 inch piping, Train B
Unit 1 Turbine Building Service Water piping

1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	1-VS-F-58 A&B
1-SW-P-10A,B	1-DA-P3A,B
01-PL-P-2A,B,C,D,E,F	02-PL-P-2A,B.C

Section 1R21.32.a: Equipment/Environmental Qualification Components Reviewed

1-CW-MOV-100A,B,C,D	1-CW-MOV-106A,B,C,D
1-SW-MOV-101A,B	1-SW-MOV-102A,B
1-SW-MOV-103A,B,C,D	1-VS-F-58 A&B
1-SW-P-10A,B	1-DA-P3A,B
01-PL-P-2A,B,C,D,E,F	02-PL-P-2A,B.C

Section 1R21.35.a.: List of Operating Experience Evaluation Responses Reviewed

S-1990-0020-E1, NRC IN 83-44, Supplement 1, Potential Damage to Redundant Safety Equipment as a Result of Backflow Through Equipment and Floor Drain System
S-1994-0160-E1, LER 94-002-N, Postulated Failure of High Head Safety Injection Pump Discharge Check Valves
S-1996-3127-E1, OE 7998: Loss of Charging Flow Due to Failure of Charging Pump Discharge Check valve to Close
S-1998-4270-E1, OE9141: Inappropriate Application of Atwood-Morrill check Valves
S-1998-4283-E1, OE 9171: Check Valve Disk Nut Locking Pin Failure
S-1999-3405-E1, PS24542: Three Mile Island - Check Valves Missing From Floor Drains
S-1998-4403-E1, SER 3-98: Recurring Event, Flooding of ECCS Rooms Caused by Fire Protection System Water Hammer
S-2003-2780-E1, OE 16267: Anchor Darling (Flowserve) model 1878 PC Piston Check Valves Insufficient Internal Clearance